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A Thyroid Tumor in a Sheepshead Minnow (*Cyprinodon variegatus*) from the Gulf of Mexico[1]

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ABSTRACT

An adenoma of the thyroid of the brackish water sheepshead minnow (*Cyprinodon variegatus*) appeared after the fish had been held in a saltwater aquarium with other fish. The tumor appeared to be well delineated grossly. Microscopically, the tumor was invasive into adjacent gill tissues but was without mitotic figures.

Thyroid enlargements in fish have been reported from a wide variety of freshwater and marine species (see reviews by MacIntyre 1960 and Wellings 1969). Although thyroid enlargements in many freshwater fish are goiterous hyperplasias, those occurring in marine fish cannot be considered to be due to iodine deficiency. Most thyroid tumors in freshwater fish regress when the animal is treated with iodine, and thus, many enlargements of the thyroid can be classified as goiters. However, some of these growths have been reported to become malignant. Thyroid tumors are rare in nature, but they are relatively common in cultured or aquarium fishes (MacIntyre 1960).

Described here is a thyroid tumor which occurred spontaneously in a sheepshead minnow (*Cyprinodon variegatus*) held in a seawater aquarium with other fish of the same and different species.

MATERIALS AND METHODS

Microscopic sections were prepared using routine paraffin-embedding methods after fixation in 10% buffered formalin. Hematoxylin and eosin were used for staining.

RESULTS

A female sheepshead minnow (*Cyprinodon variegatus*), 52 mm in total length, developed a large gular swelling spontaneously after being held for several months in a seawater aquarium with fish of the same and different species. No other fish developed tumors. The fish in the aquarium had been collected from West Galveston Bay near Galveston, Texas.

Grossly, the tumor seemed to originate from the gular region at the bases of the gill arches. The more ventral portions of the gill arches on both sides of the fish appeared to be invaded by the tumor (Fig. 1). The opercula on both sides of the fish were distended and could not be closed. Other than the tumor the only other lesions were frayed fins, particularly the caudal fin.

Microscopically, the tumor consisted almost entirely of greatly proliferated thyroid follicles and interfollicular tissue elements (Fig. 2). The height of follicular epithelium varied from low cuboidal to columnar. Equally variable were the staining characteristics of the colloid, which varied from almost chromophobic to pale eosinophilic, to a pale basophilic. Some follicles contained no colloid.

Interfollicular cells, in general, displayed a similar histological appearance to the cells making up the follicles, although they showed no tendency toward organization into follicles. These cells were apparently derived from follicular epithelial cells.

Thyroid follicles with and without colloid and interfollicular cells were invasive into the gill arches (Fig. 3). Lamellar structures of the basal portions of the gill arches were destroyed by the expanding thyroid tumor. Scattered blood sinuses of various sizes were present throughout the tumor.

Mitotic figures were not observed either in

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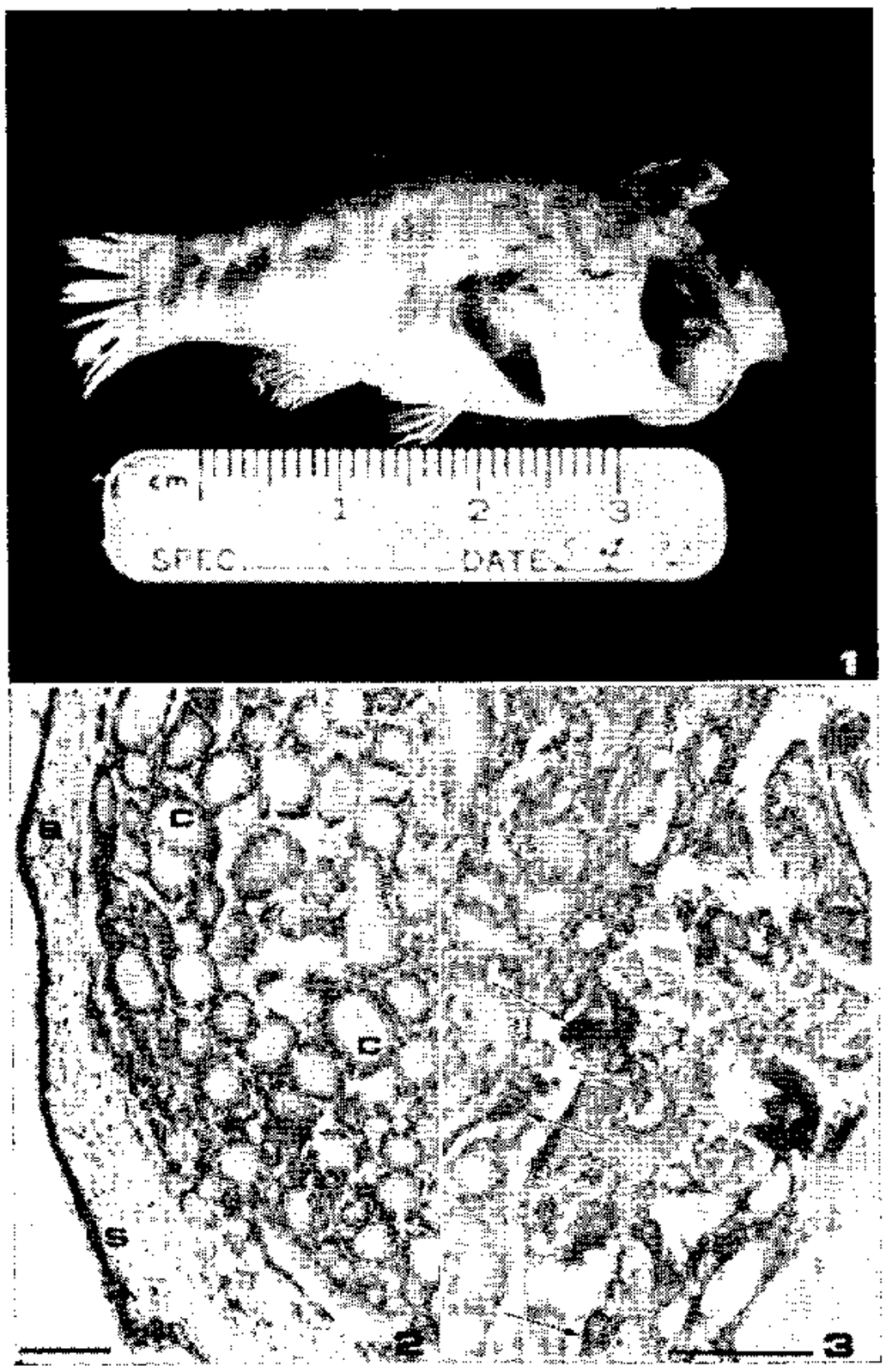

FIGURE 1.—Sheepshead minnow (*Cyprinodon variegatus*) 52 mm TL. The operculum has been cut away, exposing the thyroid tumor arising from the bases of the gill arches.

FIGURE 2.—Photomicrograph of tumorous thyroid follicles and interfollicular tissue elements. Some of the follicles contain colloid (C), but in others it is pale or absent. A thin connective tissue capsule covers the tumor surface (S). H & E. Line is 0.1 mm.

FIGURE 3.—Photomicrograph of gill tissue that has been invaded by the thyroid tumor. Remnants of the cartilaginous gill arches (arrows) and blood vessels are shown in close association with thyroid follicles. H & E. Line is 0.1 mm.

follicular or interfollicular cells. The tumor was encapsulated by a thin fibrous capsule, and there were no apparent metastases.

DISCUSSION

Nigrelli (1952) described similar if not identical thyroid tumors in 10 sheepshead minnows (4 males and 6 females) from a group of 30 fish. The fish had developed the tumors in seawater aquaria at the New York Aquarium. He described the tumors as interacinous adenomas. Mitotic figures were not observed in these tumors, but Nigrelli reported other histological signs such as extensive afollicular areas, which reportedly gave the tumors the appearance of metaplastic growths in those areas. Due to the invasiveness and the extensive proliferation of follicular and afollicular elements, Nigrelli concluded that the thyroid tumors he described in the sheepshead minnow were malignant.

Despite Nigrelli's earlier description of "malignant interacinous adenomas" in the sheepshead minnow, the thyroid tumor described here is classified as a benign adenoma. This conclusion is based on the tumor's rather benign microscopic appearance, the fact that the tumor was encapsulated, and the absence of mitotic figures and metastases.

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